

## CLAIMS

What is Claimed is:

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1. A flowchart-based programming and control system comprising:
  - a computer including a processor, memory and a display;
  - a device that is connected to said computer and is associated with a process;
  - a flowcharting module run by said computer that generates and edits
  - 5 flowchart source code that includes flowchart blocks and that contains logic for operating said device to further said process, wherein first and second flowchart blocks change an operational state of said process; and
  - a reason code module associated with said flowcharting module that assigns first and second reason codes to said first and second flowchart blocks.
2. The flowchart-based programming and control system of claim 1 wherein said flowchart module compiles said flowchart source code into flowchart object code.
3. The flowchart-based programming and control system of claim 2 further comprising:
  - a flowchart run time engine module associated with said computer for executing said flowchart object code to control said process.

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4. The flowchart-based programming and control system of claim 3 wherein said flowchart object code generates said first reason code during execution of said first flowchart block in said flowchart object code.

5. The flowchart-based programming and control system of claim 4 wherein said flowchart object code generates said second reason code during execution of said second flowchart block of said flowchart object code.

6. The flowchart-based programming and control system of claim 5 further comprising:

a performance analysis module run by said computer that records when said first and second reason codes occur.

7. The flowchart-based programming and control system of claim 6 further comprising:

a charting module run by said computer and associated with said performance analysis module that graphically represents data recorded by said performance analysis module.

8. A flowchart-based programming and control system of claim 1 wherein said reason code module allows a user to assign a sub-reason code.



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11. A flowchart-based programming and control system comprising:
- a computer including a processor, memory and a display;
  - a device that is associated with a process;
  - a flowcharting module run by said computer that generates and edits
  - 5 flowchart source code that includes flowchart blocks and that contains logic for operating said device to further said process, wherein first and second flowchart blocks assign an operational state of said process, and wherein said flowchart module compiles said flowchart source code into flowchart object code;
  - a reason code module associated with said flowcharting module that assigns
  - 10 first and second reason codes to said first and second flowchart blocks; and
  - a flowchart run time engine module associated with said computer for executing said flowchart object code to control said process, wherein said flowchart object code generates said first reason code during execution of said first flowchart block in said flowchart object code.

12. The flowchart-based programming and control system of claim 11 wherein said flowchart object code generates said second reason code during execution of said second flowchart block of said flowchart object code.

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13. The flowchart-based programming and control system of claim 12 further comprising:

a performance analysis module run by said computer that records when said first and second reason codes occur.

14. The flowchart-based programming and control system of claim 13 further comprising:

a charting module executed by said computer and associated with said performance analysis module that graphically represents data recorded by said performance analysis module.

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- 15 A method for analyzing the performance of a process comprising the steps of:
- generating flow chart source code using a flowcharting program on a computer;
- 5 connecting a device associated with said process to said computer;
- adding flowchart blocks to said flowchart source code that contain logic for operating said device to further said process, wherein first and second flowchart blocks assign operational states of said process; and
- 10 assigning first and second reason codes to the process by said first and second flowchart blocks in said flowchart source code.

16. The method of claim 15 further comprising the step of:  
compiling said flowchart source code and generating flowchart object code.

17. The method of claim 16 further comprising the step of:  
executing said flowchart object code to control said process.

18. The method of claim 17 further comprising the step of:  
generating said first reason code during execution of said first flowchart block in said flowchart object code.

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19. The method of claim 18 further comprising the step of:  
generating said second reason code during execution of said second  
flowchart block of said flowchart object code.
20. The method of claim 19 further comprising the step of:  
recording when said first and second reason codes occur.
21. The method of claim 13 further comprising the steps of:  
graphically representing the operation of said process based upon said  
recorded first and second reason

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